

Application No.: 10/761,992

Docket No.: JCLA11796

REMARKS**Present Status of the Application**

The claims 1-7 are objected because of the informalities. The Office Action also rejected claims 1-7 under 35 U.S.C. 103(a), as being unpatentable over Admitted prior art in combination with Rhodes et al. (U.S. 2004/0178430). Applicants have amended claims 1-7 to overcome the objection made by the Office Action and deem that claims 1-7 have already clearly define the invention and been distinguishable over the cited art. After entry of the foregoing amendments, claims 1-7 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Summary of Applicant's Invention

The Applicant's invention is directed to a method of fabricating an image sensor device. Before the formation of the shallow trench isolations in the trenches within the substrate, an anti-reflective layer is formed on the bottom and the sidewall of the trenches. Not only does the image sensor device of the present invention include the anti-reflective layer formed thereon, but also the anti-reflective layer is formed on the bottoms and sidewalls of the shallow trench isolation regions formed adjacent to the image sensor region. The anti-reflective layer formed in the shallow trench isolation regions can resolve the issue of light reflection at the bottoms and sidewalls of the shallow trench isolation regions when incident light passes through the shallow trench isolation regions. Therefore, the image sensor device of the present invention reduces

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light reflection at the bottoms and sidewalls of the shallow trench isolation regions. It means that the area of the effective photo sensitive region of the image sensor device increases, and currents generated at the photo sensitive region is enhanced.

Discussion of objections

According to the Office Action, the claims 1-7 were objected because of the informalities. In response thereto, applicants have amended the claims 1-7 by replacing "image" with "image". Every feature in the amended claims 1-7 is shown in Figs. 2A to 2D and no new matter is entered.

Discussion of Office Action Rejections

The Office Action rejected claims 1-7 under 35 U.S.C. 103(a), as being unpatentable over Admitted prior art in combination with Rhodes et al. (US 2004/0178430). The Office Action stated that

"the Admitted prior art discloses most part of the present invention except the formation of the anti-reflection layer between liner layer and filling layer. Rhodes et al. teaches a method of making image sensor by forming a method of making image sensor by forming silicon oxide/silicon nitride layer "154" in the trench before filling the trench with insulation material "150". Rhodes especially mention forming silicon nitride layer to smoothing out corners in the trench and to reduce stress within the trenches (see fig. 10, fig. 13 and fig. 16 and related description para 0044)."

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Applicants respectfully traverse the rejections for at least the reasons set forth below.

The present invention is directed to a method of fabricating an image sensor device. Before the formation of the shallow trench isolations in the trenches within the substrate, an anti-reflective layer is formed on the bottoms and the sidewalls of the trenches. **Because of the anti-reflection layer, the light reflection phenomenon at the bottoms and sidewalls of the shallow trench isolation regions is relieved when incident light passes through the shallow trench isolation regions.** Therefore, the image sensor device of the present invention reduces light reflection at the bottoms and sidewalls of the shallow trench isolation regions.

However, in the cited art, Rhodes et al. fail to mention to form an anti-reflection layer in the shallow trench isolation to overcome the reflection problem of the image sensor. In the cited art, Rhodes et al. provide an angled implant for trench isolation, wherein after the formation of an insulating layer 154 located on the sidewall and the bottom of the trench and before the formation of the shallow trench isolation, an implantation process is performed to form an implanted region 170 (as shown in Fig. 6). Nevertheless, Rhodes et al. never mention or teach that the insulating layer 154 possesses the functionality of anti-reflection so as to overcome the reflection problem happening around the shallow trench isolation. Although the Admitted prior art mention that the reflection problem happens around the shallow trench isolations, Rhodes et al. never consider this kind of problem in the cited art and Rhodes et al. never teach or suggest that the insulating layer 154 can be an anti-reflection layer for compress the reflection phenomenon happening around the shallow trench isolations. Therefore, there is no combination

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motivation for people skilled in the art to combine the cited art to obtain the advantage the same as the invention possesses.

In light of the amendment and the foregoing discussion, claim1 is not anticipated by prior art and are believed to be patentably distinguished from the cited art so that the reconsideration and withdrawal of the Office Action's rejection on claim 1 under 35 U.S.C § 103 are respectfully requested. Additionally, claims 2-7 respectively depend from claim1, so that claims 2-7 are believed patentable based on the above remark.

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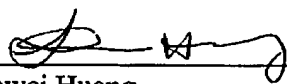
CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 1-7 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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Respectfully submitted,
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